ABSTRACT

Analytical solutions to error bounds on the temperature depth distribution have been given in this invention. Solving the one dimensional steady state heat conduction equation for different sets of boundary conditions and radiogenic heat generation and incorporating Gaussian randomness in the thermal conductivity analytical closed form solutions to the mean and variance in the temperature depth distribution have been obtained. These closed form analytical solutions of mean and variance for the temperature field for different conditions have been used to compute and display the plot and results of the temperature depth profiles along with its error bounds. Quantifying the error statistics in the system output due to errors in the system input is very essential for a better evaluation of the system behavior. Earth Scientists involved in understanding the subsurface thermal structure relevant to geodynamical studies will benefit using these findings.